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ABSTRACT

The document is the fifth in a six part research report on the assessment and treatment of deviant behavior in children. In attempting to reprogram a social environment so as to maintain behaviors modified in an experimental setting, researchers felt that it was essential that the reprograming take into account the teacher's role as a controlling agent in the regular classroom. Two studies were designed, one to investigage classroom control as a function of teacher dispensed social reinforcers, and the other to collect data on the relationships between the teacher's consequation effects and production of appropriate and inappropriate behavior and to measure the changes in the teacher's consequating behavior. In the latter experiment, the results from the behavioral observations of 44 subjects were felt to indicate that the deviant child got more than twice his share of attention and that 40% was due to inappropriate behavior. The first study, conducted over a period of 11 weeks in a fifth grade setting, was noted as indicating a high probability of teacher attention to inappropriate behavior (77% of teacher's attention). Systematic manipulation of the amount of teacher attention produced changes in rates of behavior for non-deviant subjects, making the deviant and non-deviant subjects more similar in behavior. (CD)

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Final Report

Section Five: Investigation of Some Functional Relationships Between Teacher Consequating Behavior and Pupil Performance.

Assessment and Treatment of
Deviant Behavior in Children

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INVESTIGATION OF SOME CLASSROOM CONTROL PARAMETERS AS A FUNCTION OF TEACHER DISPENSED, SOCIAL REINFORCERS

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ABSTRACT

Relationships between the teacher's consequation efforts and production of appropriate and inappropriate behavior were investigated. Results indicated a high probability of teacher attention to inappropriate behavior with deviant subjects and a high probability of teacher attention to appropriate behavior with non-deviant subjects. Deviant subjects received 77 percent of the teacher's attention while the non-deviant subjects received 23 percent.

Systematic manipulation of the amount of teacher attention in three experimental phases, no teacher attention, schedule switching, and schedule density alteration, produced changes in rates of appropriate and inappropriate behavior for non-deviant subjects in the predicted directions. The manipulations had no measurable effect upon the deviant subject's rates of appropriate and inappropriate behavior. The effect of all three experimental interventions were to make the deviant and non-deviant subjects more similar in their rates of appropriate and inappropriate behavior. This effect was due to the non-deviant subjects producing higher rates of inappropriate behavior and lower rates of appropriate behavior in the experimental phases while the deviant subjects rates remained relatively stable during these phases.

A number of recent studies have demonstrated teacher attention, approval, and praise to be effective reinforcers in increasing child behavior in the classroom setting. (Becker, Madsen, Arnold, and Thomas, 1967; Hall, Lund, and Jackson, 1968; Madsen, Becker, and Thomas, 1968; O'Leary, Becker, Evans, and Saudargas, 1969). Several studies have provided evidence that teacher disapproval, criticism, and negative attention may also have reinforcing effects upon child behavior. A study by Lovaas, Freitag, Kinder, Rubenstein, Schaeffer, and Simmons (1964) indicates that teacher attention whether positive or negative, may be reinforcing. Studies by Madsen, Becker, Thomas, Koser, and Plager (1968) and Thomas, Becker and Armstrong (1968) suggest that the teacher's use of disapproval, critical comments, and warnings can actually strengthen the behaviors to which they are applied.

Experimental subjects in the above studies usually exhibited high rates of deviant classroom behavior. Systematic intervention procedures involved varying the teacher's behavior so as to produce changes in child behavior. In these studies, the teacher with experimenter supervision, produces behavior change by substantially increasing the frequency and quality of social reinforcement for appropriate behavior. To date, no studies have investigated the natural schedules of social reinforcement the teacher applies to the classroom behavior of deviant as well as non-deviant children. With the exception of a study by Thomas, Becker and Armstrong (1968) and by Hall, Panyan, Rabon, and Broden

(1968), there have been no studies in which the specific density of such schedules were manipulated and the resulting behavioral effects evaluated. In addition, no studies have empirically demonstrated that teachers respond differently to deviant and non-deviant children in their attempts at consequating classroom behavior.

The purpose of this study was threefold. The initial goal was to verify whether the teacher, in the process of supplying consequences responds differentially to deviant and non-deviant children. The second goal was to sample the actual schedules of reinforcement the teacher supplies to deviant and non-deviant children for the general response classes of appropriate and inappropriate behavior. The third goal of the study was to examine the relative effects of these reinforcement schedules in the production, maintenance and elimination of appropriate and inappropriate classroom behavior.

Method

Subjects and Setting

The setting for the study was a fifth grade classroom in a local suburban elementary school. The teacher of the class was a university graduate with three years of reported successful teaching experience. Thirty-one children were enrolled in the classroom during the study. The mean intelligence quotient for the class, as estimated on the California Test of Mental Maturity (CTMM), was 101 with a standard deviation of 12 and a range from 76 to 131. The average achievement score on the California Achievement Test (CAT) was 5.1 (grade equivalent score) with a standard deviation of 1.2 and

a range from 2.7 to 7.6. The average chronological age for the class was 131 months with a standard deviation of 5.7 and a range from 124 to 147. Although there was substantial individual variation on the measures used, the class approximated the usual age and grade expectations in achievement and intelligence quotient.

Procedures

Teacher Selection: The teacher, Miss G., was contacted and asked if she would like to participate in the study. She indicated an interest and discussions followed about her role in the study, effect(s) upon classroom routine, length of the study, etc. The teacher was purposely not informed of any of the procedures to be used in the study. She was told she would have an opportunity to learn about classroom contingency management and that she would make an important contribution to the research effort. She was given six hours of university extension credit and her tuition paid by the project for participating in the study. To receive course credit the teacher was required to master a semi-programmed text on classroom contingency management (Buckley and Walker, 1970) and execute the experimental tasks.

Subject Selection: The teacher was asked to complete a behavior checklist (Walker, 1970) and a more comprehensive behavior rating scale (Walker, 1969) on each child in her classroom. The children were ranked according to their scores on these two instruments. Observation data were used to supplement these measures in selecting the three most deviant and the three least deviant children in the classroom. On the behavior checklist, the mean score for the class (N = 31) was 4.93 with

a standard deviation of 5.09 and a range from 0 to 20. The deviant subjects' mean score on this measure was 18. The non-deviant subjects' mean score was one. On the behavior rating scale the mean score for the class was 16.32 with a standard deviation of 12.60 and a range from 2 to 52. The deviant subjects' mean score on this measure was 43.66 while the non-deviant subjects' mean score was 2.66. On the behavior observation form used, the deviant subjects' rate of appropriate behavior was .44 per minute and their rate of inappropriate behavior was .39. For the non-deviant subjects, their rate of appropriate behavior was .59 per minute and their rate of inappropriate behavior was .21. The teacher was not informed of which children had been selected as experimental subjects until the beginning of the first experimental phase, following a two week baseline period.

Sequential Design: The study was eleven weeks in duration and followed a sequential, multiple baseline design. A two week baseline period was followed by three experimental and three additional baseline phases. During the initial baseline period, observation data were collected on both the teacher and the six subjects. Interaction rate data were tabulated for the teacher. For the entire baseline period, each interaction between the teacher and any of the six subjects was noted and recorded. These interaction data were used as a basis for estimating each subject's schedule of social reinforcement from the teacher. Stable estimates of these schedules were extremely important as they formed the basis for experimental interventions two and three.

Upon completion of the initial baseline period, the teacher was informed of the purposes and procedures of the study. A teacher aide was hired for the duration of the study in order to give the teacher enough time to perform the tasks required of her in the experiment. The teacher aide was instructed not to interact with any of the experimental subjects, under any circumstances, throughout the course of the study. The teacher read and mastered the semi-programmed text on contingency management and discussed its application in the classroom setting with the authors. The text contained chapters on the acquisition, maintenance, and elimination of behavior in addition to chapters on measuring behavior and applying operant techniques in the classroom. The teacher's working knowledge of behavioral principles was very helpful in the authors' programming of her behavior during the subsequent experimental phases.

Experimental Phase One

During experimental phase one, all social reinforcement dispensed by the teacher to the six experimental subjects, was controlled for a one week period. Social reinforcement was defined as attention from the teacher involving physical, verbal, or gestural components. A more detailed description of the definitional criteria for the components and the recording system are discussed under observation procedures. The teacher was given the following list of instructions to follow during phase 1:

1. No instructions will be given that anything is being

changed. The children will not be told that social reinforcement is being changed or controlled.

2. Each child will be limited to five questions per day. Approximately one minute of time will be allowed to answer each question. When five questions have been asked and answered, ignore any attempts by the children to ask additional questions....don't say, "I can't answer" etc.
3. No praise of any kind will be given.
4. No warnings or reprimands are to be given.
5. No comments are to be placed on papers other than the number wrong.
6. No physical contact is to be given such as gestures of approval, pats on the back, etc.

The teacher read the instructions and discussed them with the authors. Role playing and modeling were used to clarify points or details in the instructions which the teacher was unsure about. She interacted as usual with the remaining twenty-five children in the classroom.

Experimental Phase Two

Experimental phase two followed a one week return to baseline phase where the teacher interacted as she normally did with the experimental subjects. She returned to answering questions, giving praise, and administering reprimands as she did during the baseline period. Observation data on her interaction(s) with the six subjects indicated the teacher returned to original baseline levels in the frequency with which she provided social

reinforcers for inappropriate and appropriate behavior.

During experimental phase two, the schedules of reinforcement for the classes of appropriate and inappropriate behavior were switched between the three deviant and the three non-deviant subjects. Schedules of reinforcement for all six subjects were computed from data collected on teacher-subject interactions during the baseline period. The teacher was provided with a clipboard, a checklist, and a set of instructions for reinforcing each subject for both appropriate and inappropriate behavior. The written instructions to the teacher for subject one were: "Reinforce for appropriate behavior twice daily between 9 A.M. and 12. 1._____ 2. _____ .... Reinforce three times daily for inappropriate behavior between 9 A.M. and 12. 1. _____ 2. _____ 3. _____." The instructions for subject number two were: "Reinforce for appropriate behavior twice a week between 9 A.M. and 12. 1. _____ 2. _____.... Reinforce for inappropriate behavior eight times daily between 9 A.M. and 12. 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____." The teacher was instructed to place a check (✓) in the appropriate blank following each reinforcing event. The tally sheets were collected each day and the teacher given a new set for the following day.

The schedules of reinforcement for each subject, for appropriate and inappropriate behavior are presented in the first part of Table 1. The reversal of these same schedules are presented in the second part of Table 1.

Insert Table 1 About Here

The deviant subjects are three, four and five and the non-deviant subjects are one, two and six. Schedules were switched for subjects two and three, one and four, and five and six. The teacher was instructed to reinforce appropriate and inappropriate behavior according to the operational definitions contained in the observation schedule for child behaviors. (See observation procedures.) The teacher delivered social reinforcers for appropriate and inappropriate behavior according to the criteria outlined for social reinforcement in the coding form for teacher-child interactions. (See observation procedures.) The teacher was instructed to reinforce the child in exactly the same way during the experimental interventions as during the baseline and control phases. If the teacher had inadvertently increased the intensity or amplitude of the social reinforcers she delivered, it could have confounded the effects of reinforcement frequency, which was the only variable manipulated in this study. Experimental phase two was in effect for a two week period followed by a one week return to baseline phase.

Experimental Phase Three

During experimental phase three, the density of each subject's reinforcement schedule was manipulated experimentally. For the deviant subjects, the reinforcement frequency for appropriate behavior was tripled. Conversely, their reinforcement frequency for inappropriate behavior was reduced by two-thirds. For the non-deviant subjects, the reinforcement frequency for inappropriate behavior was tripled and their reinforcement frequency for appropriate

behavior was reduced by two-thirds. The manipulation of reinforcement density is presented in Table 2.

Insert Table 2 About Here

The schedules of reinforcement, as estimated from baseline data, are presented in the first part of Table 2. The manipulation of each subject's reinforcement schedule are presented in the second part of Table 2.

Observation Procedures

Child Behavior: A school observation form, developed by Ray, Shaw and Patterson (1969), was used to measure the dependent variable of child behavior in this study. The observation form provides for a "....method of 'characterizing' school situations for a given child in such a way as to facilitate understanding the determinants and consequences of social behaviors as well as the relationship of those behaviors to the classroom setting." (p. 1). The 13 response codes on the form are divided into seven inappropriate and six appropriate cateagories of classroom behavior. Inappropriate categories include noisy, aggressive, not attending, peer initiation, initiation to peer, movement around the room and inappropriate task. Appropriate categories of behavior include appropriate group behavior, individual work, reciting, volunteering, teacher initiation and initiation to teacher. Each response code is operationally defined in the manual for the observation form. Criteria are established for each response

code along with examples of same.

The form also contains codes for the classroom setting, the social consequences of child behavior and the social agent supplying the consequence. During each six minute observation session, the activities of the classroom setting are coded as group, individual, transition, or recess. The social consequences of child behavior are coded as no response, attention, praise, compliance, disapproval, non-compliance, and physical (+ or -). The social agent supplying the consequence is coded as teacher, peer or observer.

The observation form is set up as a grid. Each horizontal line in the grid defines a fifteen second interval. The six minute grid is further subdivided into two minute sections for observer convenience in reading the behavior codes. Using an observation clipboard, set for fifteen second intervals, the observer moves down one grid line each time he receives a signal from the clipboard. During each fifteen second interval, the observer records both the behavior of the subject and the social consequences of his behavior by placing the appropriate consequence and agent notation(s) in the space beneath the appropriate behavior code. More than one behavior category can be coded during a single fifteen second interval, however, once coded, the same category cannot be recoded during the fifteen second interval.

Two observers, graduate students in Special Education, were assigned to record child behaviors on a daily basis for the duration of the study. Observations were taken between 9 A.M. and 12 Noon, each day. Class activities during this period

consisted of reading, language arts, and mathematics. This instructional bloc was approximately evenly divided between group and individual activities. Group work consisted of the teacher lecturing, explaining assignments, giving instructions, or holding group discussion sessions. Periods for individual work usually followed group activities. Observations were randomly taken across this three hour bloc throughout the study so as to sample all academic areas and class activities. Observers used a sampling without replacement procedure in taking observations. One subject was randomly selected for observation and not observed again until the remaining five subjects had been selected and observed. Approximately twelve minutes of observation data or six two minute observation sessions were taken daily on each subject during the experiment.

Teacher Behavior: The authors recorded interaction data between the teacher and the six experimental subjects during the baseline portion of the study. Each interaction was noted, timed with a stop watch, and recorded on a data sheet. The authors recorded whether the interaction was a result of the child initiating to the teacher or a result of the teacher's independent initiation to the child. The child's behavior precipitating or resulting in the interaction, was coded appropriate or inappropriate according to the criteria of the observation form for child behavior. The authors also coded whether the child continued the same activity or initiated a new activity immediately following termination of the interaction. If the child changed his behavior within fifteen seconds following the

interaction, the authors coded initiation of a new activity. If the behavior did not change within this period, continuation of the same activity was coded. The child's behavior was again coded as appropriate or inappropriate following the interaction with the teacher. During the two week baseline period, the authors recorded each interaction, between 9 A.M. and 12 Noon, that occurred between the teacher and any of the experimental subjects.

The authors defined social reinforcement (teacher dispensed) as teacher attention involving verbal, physical, or gestural events in the process of interacting with any of the six experimental subjects. The verbal, physical and gestural events were further subdivided into positive, negative and cueing categories. The criteria for these categories are as follows: 1. Verbal (positive)-Any comment of a positive nature which is applied to either social or academic behavior so as to strengthen that behavior. Examples: "Good," "Well Done," "Right," "You are doing well," "Let's all try to be as neat as x." (Positive for x), also includes group praise. 2. Verbal (negative)-Any comment of a negative or aversive nature which is applied to either social or academic behavior so as to weaken that behavior. Examples: "No," "Stop that," "Warnings," "Threats," "Critical comments," "Yelling," "Scolding," "Verbal abuse," "Teacher refuses to comply with S's request." Also includes group abuse or scolding. 3. Verbal (cueing)-Setting the stage for an academic response to occur. Includes: (1) specifying assignment (2) repeating assignment (3) answering questions (4) assisting with academic task

(5) asking question. 1. Physical (positive)-Touching child in any way other than to punish or coerce into proper response. "Pat on back," "Arm around shoulder," "Leaning over with child under teacher's arm," etc. 2. Physical (negative)-Physical contact which is meted out as punishment (designed to weaken the behavior it follows) "Hitting," "Spanking," and "Shaking." 3. Physical Contact (cueing)-Physical contact which is designed to coerce S into responding or complying. "Molding child to make proper response or to restrain child from making a response," "Dragging," "Pulling," "Pushing," "Guiding gross or fine body movements on the part of the child, e.g., pushing child and chair up to desk," "Pulling child into time-out room." 1. Gestural (positive)-Gestural expressions of approval (positive feedback which are intended to strengthen the responses they follow, "Smiling," "Nodding," "Giving O.K. sign." 2. Gestural (negative)-Gestural expressions of disapproval which are intended to weaken the responses they follow, "Frowning," "Narrowing eyes," "Pointing or shaking finger." 3. Gestural (cueing)-Any gestural response, not expressing approval or disapproval which is designed to guide the S toward a correct response, "Pointing to appropriate position or object," "Modeling," "Guiding S thru a task."

Although the positive or negative valence of the teacher's response to child behavior is of interest in its own right, distinctions between teacher approval and teacher disapproval were not made in the definition of social reinforcement used in this study. Teacher attention, whether positive or negative, was coded as an interaction and defined as social reinforcement if it

involved verbal, physical, or gestural events, as described in the criteria above. The authors recognize the difficulties associated with empirically defining events as reinforceing in field settings such as the classroom. The variability in child responsiveness to social reinforcers dispensed by adults is well documented. (Patterson and Fagot, 1967; Levine and Simmons, 1962.) Positive teacher attention in the form of praise can serve as a decelerating stimulus for some children; whereas, for other children, negative teacher attention such as disapproval can function as a powerful reinforcing stimulus. (Thomas, Becker and Armstrong, 1968; Lovaas, Freitag, Kinder, Rubenstein, Schaeffer and Simmons, 1964; Madsen, Becker, Thomas, Koser, and Plager, 1967.) However, there is ample evidence in the literature indicating that teacher attention, whether positively or negatively valenced, is instrumental in maintaining both appropriate and inappropriate child behaviors. (Becker, Madsen, Arnold, and Thomas, 1967; Hart, Allen, Buell, Harris and Wolf, 1964; Walker, Mattson, and Buckley, 1969; Hall, Lund, and Jackson, 1968; Madsen, Becker and Thomas, 1968; Wasik, Senn, Welch and Cooper, 1969.)

Reliability

Approximately one month prior to the beginning of the study, the two observers were given the coding manual for the observation form developed by Ray, et. al. The observers memorized the operational definitions for the response codes and familiarized themselves with the grid system, social agent, and consequence

codes. The observers were initially trained in an experimental classroom setting for behaviorally disordered children. Observer training was supervised by a graduate research assistant experienced in using the observation form in both the experimental and regular class setting. Observations were taken on subjects in the experimental classroom through one-way glass from an adjoining room. The observers were thus free to discuss differences in behavioral coding among themselves and with the training observer in the process of establishing reliability.

Inter-rater reliabilities were calculated by a percent agreement method in which number of agreements was divided by the total number of time intervals. Agreements were defined as two observers coding the same consequence and agent events under the appropriate behavior category in a given fifteen second interval. Each observer was required to reach a criterion of five consecutive two minute observations of .80 or better with the training observer. The observers were then required to achieve the same criterion with one another. The observers then entered Miss G.'s classroom and reestablished their reliability in this setting, according to the same criterion, prior to beginning baseline observations. Inter-rater reliabilities during the experimental class training sessions averaged .87 and ranged from .50 to 1.00. Inter-rater reliabilities during the training sessions in the regular class setting averaged .90 and ranged from .62 to 1.00.

Results

Teacher-child Interaction Data. During the initial two week baseline period, there were 144 separate interactions between the teacher and the six experimental subjects. This is equal to a rate of .40 interactions per minute. Seventy of the 144 interactions were a result of the child initiating to the teacher and 74 were a result of the teacher's independent initiation to the child. The distribution of these interactions and the resulting teacher attention was quite unequal among the six subjects. Of the 74 interactions resulting from the teacher's initiation to the subjects, 57 or 77% involved the three deviant subjects and 15 interactions or 23% involved the non-deviant subjects. For the deviant subjects, 51 of the 57 interactions were a result of the teacher consequating inappropriate behavior and six were a result of the teacher consequating appropriate classroom behavior. Thus, for the three deviant subjects, the conditional probability was .89 that the teacher's attention would be dispensed for inappropriate behavior. For the non-deviant subjects, 14 of the 17 interactions were a result of the teacher consequating appropriate behavior and three were a result of her consequating inappropriate behavior. The conditional probability was .82 that, for the non-deviant subjects, the teacher's attention would be dispensed for appropriate behavior. The actual distributions of teacher attention for individual subjects across the 74 interactions are presented in Table 3.

Insert Table 3 About Here

Subjects three, four and five are the deviant subjects and one, two and six are the non-deviant subjects. In Table 3, the non-deviant subjects' reinforcement frequency is substantially lower than for the deviant subjects and indicates that more teacher attention was received for appropriate than inappropriate behavior. The reinforcement frequency for the three deviant subjects is considerably higher and shows a major imbalance in amount of reinforcement received for appropriate and inappropriate behavior. The deviant subjects received nearly nine times as much teacher attention for inappropriate behavior as for appropraite behavior.

Conditional probabilities were computed from the frequency data on the teacher's independent initiations to the six subjects (N = 74) so as to illustrate the functional relationship(s) between child behavior and teacher consequation. The conditional probability was .24 that when the teacher gave her attention to any of the six subjects, it would be for appropriate behavior. Conversely, the probability was .76 that her attention would be dispensed for inappropriate behavior. When analyzed by subject classification, the probabilities that teacher attention would be given for appropriate behavior were .11 for the deviant subjects and .76 for the non-deviant subjects. The conditional probabilities for inappropriate behavior were .89 for the deviant subjects and .24 for the non-deviant subjects.

Across all subjects the conditional probability was .94 that teacher attention dispensed for appropriate behavior would be followed by appropriate behavior (in the post-interaction 15 second interval). The conditional probability for teacher

attention dispensed for inappropriate behavior was .58 that it would be followed by inappropriate behavior. Less than 50% of the time was the teacher's consequation of inappropriate behavior with her attention effective in terminating or altering that behavior. This held true for both deviant and non-deviant subjects. By subject classification, the conditional probability was .60, for defiant subjects, that the teacher's attention for inappropriate behavior would be followed by inappropriate behavior. For non-deviant subjects, the probability was .57. These probabilities indicate that the experimental subjects were negatively reinforcing the teacher on an intermittent schedule for her consequation attempts. For example, the deviant subjects, especially subject #3, would often persist in the behavior the teacher wanted him to terminate through three or four interactions with the teacher. Only on the fourth or fifth consequation trial would he reinforce the teacher by terminating the inappropriate behavior. At other times, he would reinforce the teacher on the first or second trial. This schedule appeared to maintain the teacher's consequating behavior at a very high rate.

Experimental Intervention. Average rates for the three deviant, three non-deviant and total subjects across baseline, experimental, and control sessions are presented in Fig. 1. Average rates of appropriate and inappropriate behavior are presented for each group. These rates are a composite of the seven inappropriate behavior categories and the six appropriate behavior categories contained in the observation form for child behavior.

Insert Fig. 1 About Here

In Fig. 1, the deviant subjects' average rate of inappropriate behavior for the baseline period was .44. Their corresponding rate for appropriate behavior was .39. The average rate of inappropriate behavior for the non-deviant subjects was .21 and their average rate of appropriate behavior was .59 for the same period. The total rates for all six subjects were .30 for inappropriate behavior and .52 for appropriate behavior.

During experimental phase one, there was a substantial increase in the amount of inappropriate behavior produced and a substantial decrease in the amount of appropriate behavior. Inspection of Fig. 1 indicates that the deviant subjects' rates remained stable while the rates for the non-deviant subjects were altered dramatically by the experimental intervention. The effect of this procedure was to make the two sets of subjects more similar in their behavioral rates.

In baseline two, the rates of the deviant and non-deviant subjects were nearly identical to their rates in the baseline period. Although the total amount of inappropriate behavior for total subjects was slightly smaller in this phase than during baseline, the two sets of subjects were clearly differentiated in their rates of appropriate and inappropriate behavior during baseline two.

In experimental phase two, because of the schedule switching between deviant and non-deviant subjects, it was predicted that the two sets of subjects would become more similar in their behavioral rates. This hypothesis was supported by the data in Fig. 1. However, the results of this intervention for the non-deviant subjects provide stronger support for the hypothesis than do the

results for the deviant subjects. For example, the non-deviant subjects' rate for inappropriate behavior increased from .18 per minute during baseline two to .25 during experimental phase two. Their rate of appropriate behavior decreased from .55 to .51 per minute. The deviant subjects' rate of inappropriate behavior decreased from .30 to .29 per minute while their rate of appropriate behavior increased from .49 to .52 per minute.

During baseline three, the deviant and non-deviant subjects were again clearly differentiated in their rates of appropriate and inappropriate behavior. The total subjects' rate of appropriate behavior was highest during this phase and their rate of inappropriate behavior lower than in any other phase during the experiment. These rate changes are due primarily to the non-deviant, rather than the deviant subjects. The deviant subjects' rates remained relatively stable while the non-deviant subjects' rate for appropriate behavior increased from .51 to .65 and their rate for inappropriate behavior decreased from .25 to .12 per minute.

During experimental phase three, it was predicted that the two sets of subjects would become more similar in their behavioral rates due to experimental manipulation of schedule densities for appropriate and inappropriate behavior. The data in Fig. 1 provide support for this prediction, but as in experimental phase two, results for the non-deviant subjects more clearly support the prediction. The non-deviant subjects' rate of appropriate behavior decreased from .65 to .57 per minute and their rate of inappropriate behavior increased from .12 to .17 per minute. The deviant subjects' rate of inappropriate behavior remained

stable at .27 while their rate of appropriate behavior decreased from .50 to .48 per minute.

During baseline four, the deviant and non-deviant subjects' rates were again differentiated for appropriate and inappropriate behavior. It is of interest to note that during the baseline phases, the total subjects' rate for appropriate behavior was .53 and .24 for inappropriate behavior. While during experimental phases one, two and three, the total subjects' rate for appropriate behavior was .49 and the rate for inappropriate behavior was .28.

Average rates during baseline and experimental sessions for individual deviant and individual non-deviant subjects are presented in Fig. 2.

Insert Fig. 2 About Here

The data in Fig. 2 make possible comparisons between deviant and non-deviant subjects and also facilitate within subject comparisons on rates of appropriate and inappropriate behavior. In Fig. 2, the effects of the three experimental interventions were most clearly reflected in the non-deviant subjects' rates of appropriate and inappropriate behavior. Changes were produced in the non-deviant subjects' behavior, in the predicted directions, during all three experimental interventions. Reversal effects were also produced upon withdrawal of the experimental interventions. Some tentative support for the prediction in experimental phase two is provided by the deviant subjects' behavior. However, the support is rather tenuous when results of this phase are compared

with those in the following baseline phase. Since experimental intervention procedures had a questionable effect upon the deviant subjects' behavior, it was impossible to isolate reversal effects.

Discussion

The relative stability of the deviant subjects' behavior and the sensitivity of the non-deviant subjects' to the experimental intervention procedures is one of the best documented results of this study. The resistance of high-strength deviant behavior to intervention procedures that manipulate only one treatment variable at a time is well documented in studies by Madsen, Becker and Thomas (1968) and by Kuypers, Becker and O'Leary (1968). These studies suggest that the simultaneous application of a number of treatment variables including token reinforcement, social reinforcement, and time-out is necessary for the efficient modification of deviant classroom behavior. In addition, results of studies investigating the generalization and maintenance of behavior following treatment indicate that careful attention must be given to the sequencing and fading of treatment variables or treatment gains are likely not to maintain. (Walker, Mattson and Buckley, 1969; O'Leary, Becker, Evans and Saudargas, 1969; Martin, Burkholder, Rosenthal, Tharp and Thorne, 1968.) As the baseline data on teacher-child interactions indicated, the deviant subjects' inappropriate behavior was maintained on a very dense schedule of teacher attention while their appropriate behavior was maintained on an extremely lean schedule. The schedule alterations were only in effect for two weeks in each experimental phase. If the

schedule densities had been maintained for a two or three month period, the effects upon the deviant subjects' behavioral rates might have been more pronounced.

The differential response of the deviant and non-deviant subjects to the experimental intervention procedures could perhaps be attributed to a prior history of social reinforcement or to some other source of reinforcement in the classroom such as peers. For example, the deviant subjects could have received increased supplemental reinforcement from peers during the phases in which the schedules from the teacher were controlled. This hypothesis was not supported by the data on peer interactions with the deviant subjects during the study. During experimental phases one, two and three, the rates of peer interaction with the three deviant subjects were .59, .51 and .46 respectively. The corresponding rates during baseline phases one, two and three were .50, .47 and .51 for the deviant subjects. The first hypothesis seems more plausible, i.e., that a dense schedule of intermittent, social reinforcement had shaped and maintained the subjects' inappropriate behavior over a long period of time. The high-strength of the behavior was reflected in its resistance to extinction in experimental phase one and its resistance to schedule manipulations in experimental phases two and three. The three deviant subjects had a history of disruptive behavior in the school and had been regarded as "holy terrors" by the school staff for several years. It is thus possible that the deviant subjects' high rates of inappropriate behavior had also been selectively reinforced and maintained by previous teachers.

The functional relationship between the deviant subjects' inappropriate behavior and the teacher's efforts at consequating that behavior can be related to the reciprocity-coercion hypothesis developed by Patterson and Reid (1969). The hypothesis states that coercive mands are applied to a reinforcement dispenser (adult) that are highly aversive. The interaction is terminated when the adult yields to the coercive manding. Thus, the behavior of the reinforcement dispenser is maintained through negative reinforcement (termination of the aversive manding) and the child's coercive manding is maintained through positive reinforcement (adult yielding to mands). This hypothesis characterizes the teacher's interactions with the three deviant subjects. The subjects would terminate the aversive mand (disruptive or deviant classroom behavior) only after one or more attempts by the teacher at consequation. These attempts were almost exclusively verbal and included such comments as, "sit down," "get to work," "I told you to be quiet," "stop disrupting the class," "if you do that one more time I'll ..." This held true for consequation attempts with both deviant and non-deviant subjects. However, the difference seemed to be in the intermittency with which the two sets of subjects negatively reinforced the teacher by terminating the disruptive behavior. The non-deviant subjects would usually terminate the inappropriate behavior on the first or second consequation attempt. The deviant subjects sometimes would not terminate the aversive behavior until the fourth, fifth, or even sixth attempt by the teacher to consequate the behavior.

The conditional probabilities computed from the frequency data, collected during baseline, demonstrate the control that deviant subjects can exercise over the teacher's behavior. These

three subjects occupied a major portion of her time, whereas the non-deviant subjects were barely noticeable to her. These data suggest how deviant behavior is reinforced and maintained at a very high rate by the teacher's efforts at consequation. The inefficiency of the teacher's consequation attempts (conditional probability = .58) in changing or terminating the inappropriate behavior serves to intermittently reinforce such attempts and maintain the teacher's behavior at very high strength. As a result, the deviant subjects could produce immediate reinforcement from the teacher by simply emitting disruptive behavior.

In the authors' opinion, Miss G. was a rather typical teacher in the areas of classroom management and educational programming. As she put it, "I always try to be on top of behavior problem situations and never let anything slip by unnoticed." She had three years of successful teaching and her teaching lessons were well organized and clearly presented. There were three or four students in her class who were very difficult to manage and she accepted this as a natural part of teaching. If Miss G. is typical of elementary classroom teachers, it would appear that a systematic teacher training program in behavior management techniques could greatly improve the teaching process.

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FOOTNOTES

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Table 1

Schedule Reversal Between Deviant and Non-Deviant Subjects in Experimental Phase # 2.

	Reinforcement Frequency for Subjects During Baseline Period$_1$*			
Subject	Behavior Appropriate	(total)	Inappropriate	(total)
1	2 / a day	10	8 / a week	8
2	2 / a day	10	5 / a week	5
3	2 / a week	2	8 / a day	40
4	2 / a day	10	3 / a day	15
5	2 / a week	2	2 / a day	10
6	8 / a week	8	1 / a week	1
		42		79
	Reinforcement Frequency for Subjects During Experimental Phase # 2			
Subject	Behavior Appropriate	(total)	Inappropriate	(total)
1	2 / a day	10	3 / a day	15
2	2 / a week	2	8 / a day	40
3	2 / a day	10	5 / a week	5
4	2 / a day	10	8 / a week	8
5	8 / a week	8	1 / a week	1
6	2 / a week	2	2 / a day	10
		42		79

* Schedules are for a one-week period of baseline$_1$.

Table 2

Alterations of Individual Subject Reinforcement Schedules During Experimental Phase # 3.

	Reinforcement Frequency for Subjects During Baseline Period$_1$			
Subject	Behavior			
	Appropriate	(total)	Inappropriate	(total)
1	2 / a day	10	8 / a week	8
2	2 / a day	10	5 / a week	5
3	2 / a week	2	8 / a day	40
4	2 / a day	10	3 / a day	15
5	2 / a week	2	2 / a day	10
6	8 / a week	8	1 / a week	1
		42		79
	Reinforcement Frequency for Subjects During Experimental Phase # 3			
Subject	Behavior			
	Appropriate	(total)	Inappropriate	(total)
1	3 / a week	3	5 / a day	25
2	3 / a week	3	3 / a day	15
3	6 / a week	6	2 / a day	10
4	6 / a day	30	1 / a day	5
5	6 / a week	6	3 / a week	3
6	2 / a week	2	3 / a week	3
		50		61

Table 3

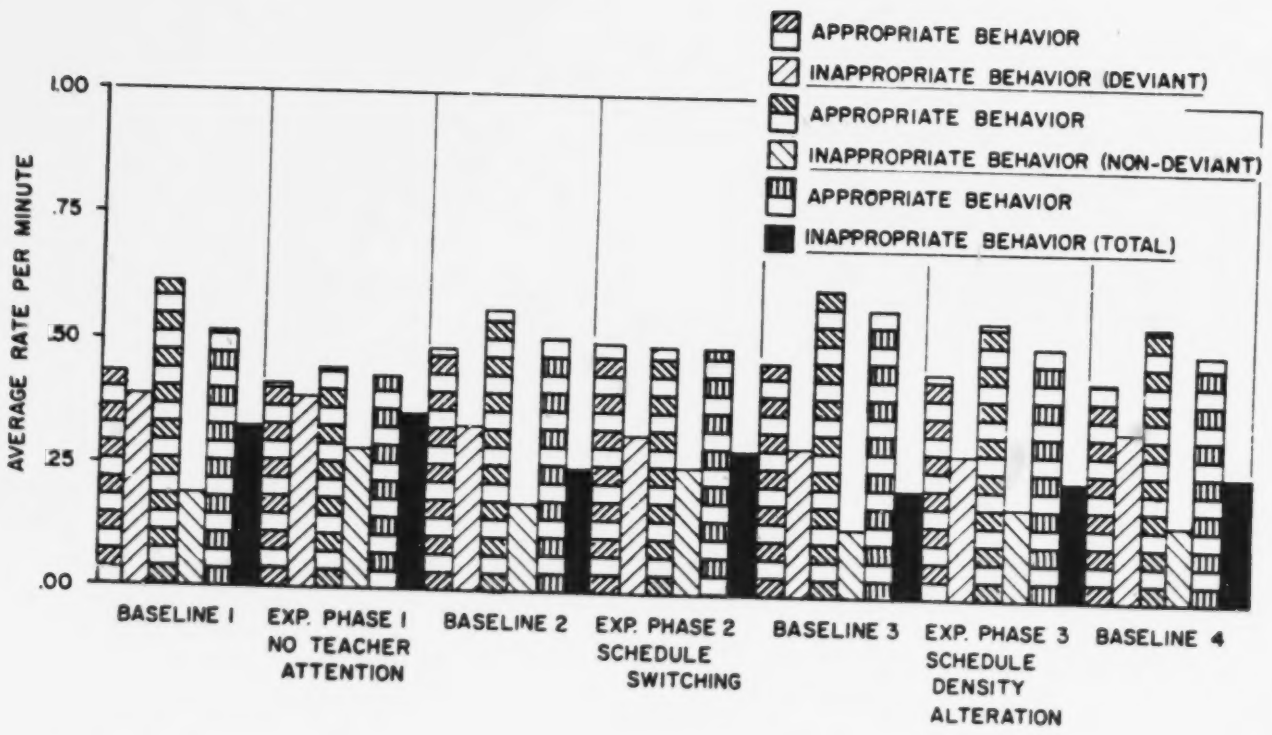
Individual Subjects' Rate and Amounts of Teacher Attention for Appropriate and Inappropiate Behavior During Baseline Period I.

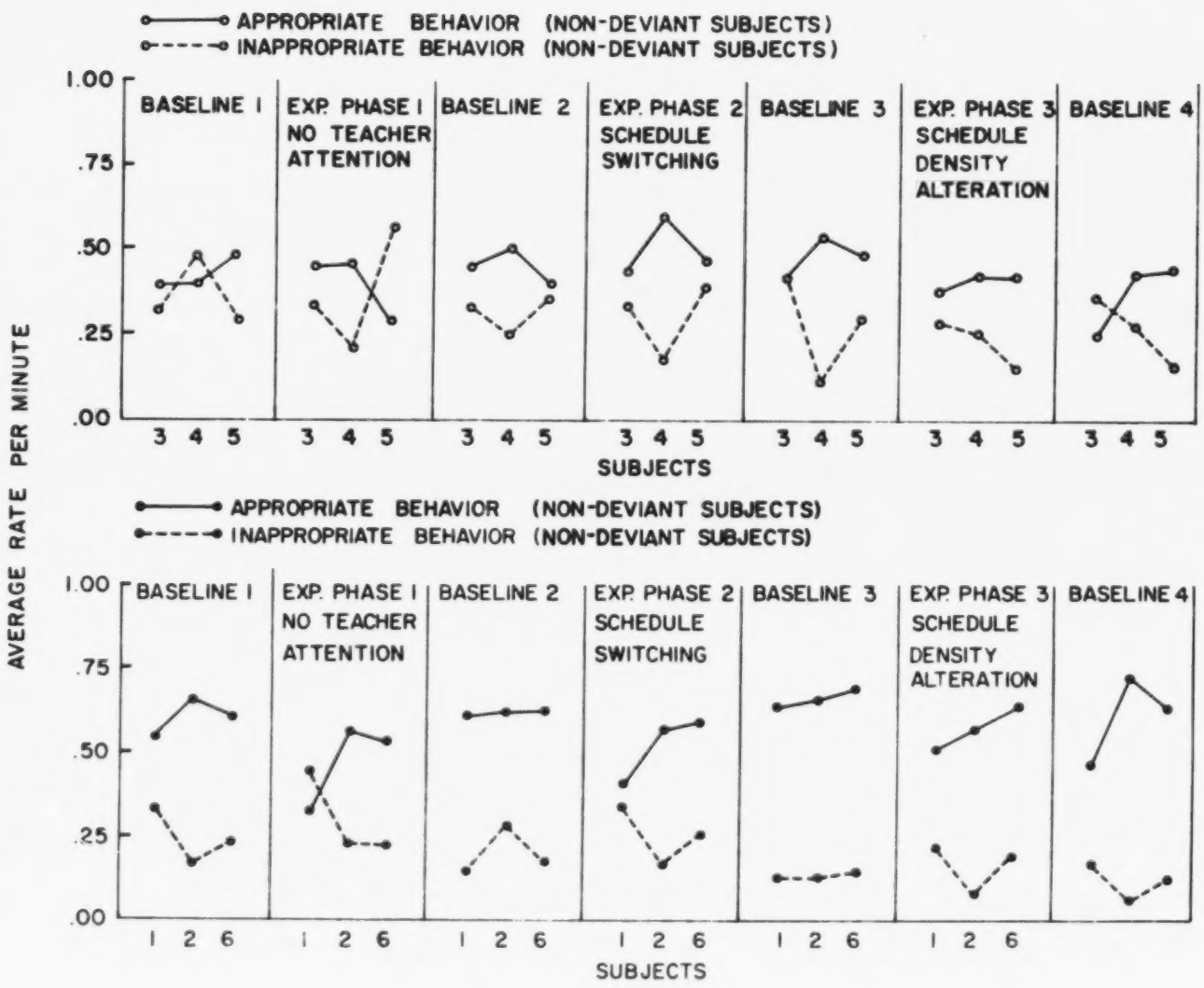
Subject	Amount		Rate	
	Appropriate Behavior	Inappropriate Behavior	Appropriate Behavior	Inappropriate Behavior
1	4	3	.01	.008
2	4	2	.01	.005
3	1	31	.002	.08
4	4	11	.01	.03
5	1	9	.002	.02
6	3	1	.008	.002

Figure Captions

Figure 1 — Average Rates of Appropriate and Inappropriate Behavior for Deviant Subjects, non-Deviant Subjects, and Total Subjects in Baseline and Experimental Phases.

Figure 2 — Average Rates of Appropriate and Inappropriate Behavior for Individual Deviant Subjects and for Individual Non-Deviant Subjects in Baseline and Experimental Phases.


APPROPRIATE BEHAVIOR
INAPPROPRIATE BEHAVIOR (DEVIANT)
APPROPRIATE BEHAVIOR
INAPPROPRIATE BEHAVIOR (NON-DEVIANT)
APPROPRIATE BEHAVIOR
INAPPROPRIATE BEHAVIOR (TOTAL)
AVERAGE RATE PER MINUTE
1.00
.75
.50
.25
.00
BASELINE 1
EXP. PHASE 1 NO TEACHER ATTENTION
BASELINE 2
EXP. PHASE 2 SCHEDULE SWITCHING
BASELINE 3
EXP. PHASE 3 SCHEDULE DENSITY ALTERATION
BASELINE 4


APPROPRIATE BEHAVIOR (NON-DEVIANT SUBJECTS)
INAPPROPRIATE BEHAVIOR (NON-DEVIANT SUBJECTS)
AVERAGE RATE PER MINUTE
1.00
.75
.50
.25
.00
BASELINE 1
EXP. PHASE 1 NO TEACHER ATTENTION
BASELINE 2
EXP. PHASE 2 SCHEDULE SWITCHING
BASELINE 3
EXP. PHASE 3 SCHEDULE DENSITY ALTERATION
BASELINE 4
3 4 5
1 2 6
SUBJECTS

Free Operant Teacher Attention to Deviant Child Behavior Following Treatment in a Special Class

Submitted for Review and Publication to:
Psychology in the Schools

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Abstract

Forty-four children exhibiting deviant behaviors were studied in terms of amount of time the teacher responds to them and the kinds of behavior to which she responds. The results from behavioral observations indicated that the deviant child got more than twice his "share" of attention in the regular classroom, and that 40 percent of this attention was to inappropriate behaviors, most often in the form of verbal reprimand.

Following treatment for the child outside the classroom, the teacher responded less frequently to inappropriate behaviors of the child. This may be due to change in child behavior rather than teacher behavior, however.

Assuming that higher rates of attention to appropriate behavior are desirable along with lower rates to inappropriate behavior, the schedule can be altered to obtain such results. Simply recording the behavior was enough to produce a five-fold increase in praise among contingency trained teachers.

Free Operant Teacher Attention to Deviant Child Behavior Following Treatment in a Special Class

Buckley, Nancy K., Walker, Hill M.

The regular elementary school classroom represents a complex environment where the behavior of any one child is influenced daily by any or all of the twenty-five to thirty members present. Yet the only individual with the ability to interact with and shape the behavior of all other members is the teacher. The positive relation between teacher approval and learning has been studied for many years (Hurlock, 1924; Ojemann & Wilkinson, 1939). Yet only recently have investigators begun to explore the potency of teacher attention, approval, and praise in increasing appropriate child behaviors (Allen, Henke, Harris, Baer, & Reynolds, 1967; Becker, Madsen, Arnold, & Thomas, 1967; Hall, Lund, & Jackson, 1968; Madsen, Becker, & Thomas, 1968; Hall, Panyan, Rabon, & Broden, 1968; O'Leary, Becker, Evans, & Saudargas, 1969).

Since teacher behaviors can, and do, control student behavior the problem becomes one of explaining why deviant behavior occurs in the classroom. One explanation supported by laboratory data suggests that boys exhibiting deviant behavior are less responsive to social reinforcement (Levine & Simons, 1962; Patterson, 1965; Patterson, Hawkins, McNeal, & Phelps, 1967). This explanation would apply to only a few children at most in any classroom. In addition, research evidence indicates that social reinforcers can effectively control behavior of deviant children when previously paired with tokens

(Walker, Mattson & Buckley, 1969). Other than lack of responsiveness to social reinforcers by some deviant children, three prominent theories help explain why deviant behavior persists in the classroom.

1. Deviant behavior is the consequence of an intermittent reward and punishment schedule (Bandura & Walters, 1963). That is, the behavior of the child is sometimes punished but at other times rewarded by the environment. The resulting intermittent schedule, as laboratory studies substantiate, results in behavior more resistent to extinction.

2. The critical comments designed to terminate the behavior, do in fact accelerate the deviant behavior in some children and thus can be assumed to be reinforcing in themselves (Lovaas, Frietag, Kinder, Rubenstein, Schaeffer, & Simmons, 1964; Thomas, Becker, & Armstrong, 1968; Madsen, Becker, Thomas, Kaser, & Plager, 1968).

Gallimore, Tharp, and Kemp (1969) studied the hypothesis that in the absence of positive attention some children would rather receive negative attention (disapproval) than indifference. Twenty-six subjects in grades three and four were randomly assigned to either a period of social deprivation or a brief, "warm" interaction with the experimenter. This was followed by a probability matching task. For a "right" choice a light flashed; for a "wrong" choice (low probability button) a panel opened to reveal the experimenter's face and verbalized mild reproof ("you're wrong"). Results indicated that socially deprived subjects, judged as high in need for approval, showed a significantly greater tendency to choose the "wrong" answer.

3. By using a combination of deviant and adaptive behaviors, the deviant child tends to obtain more positive reinforcers (Patterson, Cobb, Ray, 1970). "... for the deviant child the 'other' consequences produced by his coercive mand behaviors are high incentive consequences which have a greater impact in controlling his behavior than do the garden variety generalized social reinforcers ...[p. 4]."

Patterson, et. al. are thus measuring the effects of the child's response schedule on the adult as opposed to the adult's consequating schedule on the child (e.g., Bandura & Walters, 1963). The data from family interaction (Patterson & Reid, 1970) as well as the classroom indicate that deviant children receive higher rates of attention for both positive and negative behaviors. In studies of total classroom interaction, data indicates that the teacher attends to deviant behavior as often proportionately as appropriate behaviors (Hotchkiss, 1966; Hall, Lund, & Jackson, 1968; Walker & Buckley, 1970). In addition, Walker & Buckley (1970) found that the deviant subjects obtained 77 percent of the teachers attention, while the non-deviant subjects received only 23 percent.

In terms of praise alone, however, the results to date indicate that the high achievers are more likely to be recipients of teacher praise. de Groat and Thompson (1949) studied four sixth grade classrooms and found that teachers gave more praise to the brighter, better adjusted, high achieving children in the classroom. This data, however, suffers from lack of direct observation. The authors chose instead to use a "Guess Who?" approach in soliciting from the children

descriptions of peers as receiving teacher approval or disapproval. Brophy and Good (1969) studied teacher pupil interactions in four first-grade classrooms. For a teacher ranking of achievement, three boys and three girls ranked as high achievers and three boys and three girls ranked as low achievers were observed from each class. They found that high achievers more frequently show their work to the teacher and ask her questions about it than the low achievers. A significant difference was also found in criticism by the teacher with more being directed toward low achievers.

There was also consistent evidence that the teachers demanded and reinforced "quality" performance more among high than low achievers. Despite total number of responses, the high achievers were more frequently praised when correct and less frequently criticized when incorrect or unable to respond. In addition the teachers failed to give feedback (correct or incorrect) to oral responses 3.33 percent of the time for the high group and 14.75 percent of the time to the low group, which represents a statistically significant difference.

The teachers criticised the low expectancy group behavior over twice as much (4.92%) as the high expectancy group (2.04%). In addition wrong answers were followed by teacher criticism 18.77 percent of the time for the low expectancy group and only 6.46 percent of the time for the high expectancy group. This difference was significant at the .01 level.

The above theories or hypotheses are not incompatible. Future research may indicate a combination of any or all of these theories

account for the maintenance of deviant behavior. They do, however, suggest that there are many questions of social interaction left to be answered.

The following study is an attempt to provide additional information on amounts of teacher attention available to the deviant child within different classroom settings and conditions. Specifically, the purposes of the present study were as follows:

1. To measure the relative amounts of teacher attention to appropriate and inappropriate behaviors of behaviorally deviant children in the regular classroom.

2. To measure the relative amounts of attention to appropriate and inappropriate behavior for the same children by teachers trained in the use of contingent teacher attention.

3. To measure the relationship of proportion of responses to appropriate/inappropriate prior to outside treatment for the child to responses following treatment. In other words, does the teacher change her behavior toward the child who is now reportedly "cured."

4. To measure the relation between teacher frequency of response to appropriate and inappropriate behaviors and observations of child behavior.

5. To measure the relation among various post-treatment strategies and teacher consequence to appropriate and inappropriate responses. Of the four post-treatment strategies one gave brief, direct training and modeling to the teacher. The impact of this training was measured.

6. To measure the proportion of teacher attention to appropriate behaviors of subject child in relation to total teacher time available.

7. Computation of rate per minute for total praise and disapproval under pre-treatment, treatment, and post-treatment conditions.

8. To measure the effects of self-recording on frequency of praise by teachers.

Method

Subjects

Students. Forty-four children (39 males; 5 females), ranging in age from 8.1 to 12.6 years, were identified as exhibiting deviant behavior in the classroom. The children were selected from a total population of approximately 10,000 children in grades three through six in the participating school district. The children were selected on the basis of teacher report (Walker Problem Identification Checklist, 1970 and Walker Behavior Rating Scale, 1969) and independent classroom observations. Those children with the highest overall deviancy scores were selected for treatment; provided they were average or above in intelligence (Wisc; Stanford-Binet). All candidates exhibited behaviors such as teacher defiance, distractibility, hyperactivity, and tantrum behavior. Individual behaviors exhibited were physical and verbal abuse of peers, predelinquent behaviors (stealing, smoking, glue-sniffing), rejection of peer interaction, and excessive verbal outbursts (swearing, loud noises, smart talk).

Teachers. The total sample of teachers included the 44 regular classroom teachers from whose classrooms the deviant children were selected and the two teachers in the special classroom. In the sample

of 44 regular classroom teachers, nine were males and 33 were females. The two treatment class teachers- a certified teacher and a teacher aide- were both female. The average teacher-pupil ratio was 1:24 in the regular classroom and 2:6 in the treatment classroom.

The special classroom teacher and teacher aide were trained in techniques of token classroom management prior to the beginning of the school year. They also enrolled in a course in theory of behavior modification taught by one of the experimenters. The experimenters monitored their performance throughout the school year.

The regular classroom teachers had little or no previous experience with behavior modification techniques. Acceptance of a child in the treatment classroom was made contingent upon teacher cooperation in all phases of observation and intervention.

Settings

Pretreatment. The pretreatment setting consisted of the 44 regular elementary classrooms in 26 separate schools. No attempt was made to alter the setting in any way from the pattern chosen by each individual teacher. Baseline data indicated the children attended to appropriate classroom stimuli on the average only 44.59 percent of the time.

Treatment. The treatment phase consisted of bringing the children into a token economy classroom run by the experimenters in one of the elementary school buildings. The treatment program is described in detail in a paper by Walker, Mattson, and Buckley (1969). Over a two-year period, the children were phased into the classroom in groups of six children each for two months of treatment.

The treatment classroom consisted of a primary area for academic activities containing six double desks (approximately 20" x 45" work surface), the teacher's desk, and tables for high interest materials. A small isolation room, for using time-out procedures, adjoined the main classroom. The children used the same playground and lunch facilities as the regularly enrolled students in the school.

Since many of the children were from one to four years deficient academically, individualized instruction in the basic skills areas was employed utilizing programmed instruction materials.

Three reinforcing climates operated concurrently for appropriate academic and social behaviors. These reinforcers were individual token, group token, and social. Aversive procedures were also built into the treatment model in the form of withdrawal from a reinforcing climate (time-out and suspension) and response cost (removal of points). The schedules were altered over the two-month period to reduce the frequency and amount of reinforcers dispensed.

During treatment the academic gains for subjects averaged one year in math (Stanford Diagnostic Arithmetic Test) and nine months in reading (Gates McKillop Reading Diagnostic Test). Attending to appropriate stimuli increased to an average of 90.29 percent of the time. Both academic and behavioral results are statistically significant. The results for each individual child were reported to the appropriate teacher. They were thus aware of the dramatic change in the child's behavior during the two-month period.

Post-treatment. Following treatment, the subjects were phased back into their original classrooms. These subjects were randomly

assigned to one of three maintenance strategies or a control group upon their return. The maintenance strategies were peer group re-programming, equating stimulus conditions between the experimental and the regular classrooms, and brief teacher training in behavior management techniques. These procedures and the control were in effect during the entire post-treatment period (two months). The attending behavior averaged 65.27 percent during post-treatment. A more complete discussion of the generalization results is found in Walker and Buckley (1970).

Observation and recording

Teacher and subject behaviors were recorded on a form developed and tested by Ray, Shaw, and Patterson (1968). Each coding sheet provides information on behavior of subject, social consequence, agent supplying consequence, and description of the classroom situation for a six-minute period. The rating form has 15 columns for classroom behaviors. Twenty-four corresponding rows represent 15-second intervals. The observer records and then moves down a row each time a 15-second interval is complete. During each 15-second interval the observer records both the behavior of the subject and the social consequences of his behavior. Thus the interaction between teacher behavior and subject behavior is recorded.

The complete description of the coding form is available in Buckley, Walker, Bridges, and Hendy (1970). The form records 13 classroom behaviors and 8 agent responses. For purposes of this study the child behaviors were considered either appropriate or inappropriate.

Appropriate behaviors were participating in group work, working on assigned individual task, reciting, volunteering or initiating, or attending to teacher. Inappropriate behaviors were defined as behaviors which were noisy, aggressive, not attending to appropriate stimuli, initiation to peer, movement around room, and working on an inappropriate task.

All teacher behavior in relation to the subject child was coded as either attention to appropriate or inappropriate work.

For purposes of computation, attention to appropriate behavior was defined as any teacher response to student individual work, group work, reciting, or volunteering. If the teacher attended to the child while he was engaged in noisy behavior, aggressive behavior, non-attending, initiation to peer, movement around the room, or inappropriate work, it was recorded as teacher attention to inappropriate behavior.

Not all attention involved direct positive or negative comments. However, when positive teacher initiations occurred they were recorded as well as negative initiations. Positive initiations were made up of praise or physical contact.

"Praise: Coded when the subject receives praise or approval from teacher; may be verbal behavior or consist of gestures, e.g., smiles, head nods, applause."

"Positive physical contact would include such behaviors as hugs, pats on back, etc."

Negative initiations were composed of disapproval and negative physical contact.

"Disapproval: Coded when a subject behavior is followed by verbal or gestural disapproval from an agent; examples might be frowning, negative head nods, "you shouldn't have done that, etc."

"Negative physical contact would include aggressive behaviors from an agent such as hitting, spanking, etc." [Ray, et. al., 1968].

Reliability

Before beginning to collect data, each new observer was given a copy of the observation form and manual to read and master. Once the categories were memorized to the satisfaction of the observer, he was brought into the observation facilities to practice taking observations. The new observer worked with the experimenter or observer trainer during a trial period. When each observer felt comfortable with his coding, the trainer took simultaneous recordings to check reliability.

Reliability was calculated by scoring each interval in terms of whether the two observers agreed or disagreed. By the percent agreement method, the number of agreements was divided by the total number of observation intervals to obtain the reliability coefficient. For an agreement to be scored in any one interval, observers were required to agree on the behavior code (15 categories) as well as the type of agent response (8 categories) that consequented the behavior.

In measuring reliability of an observer's recordings, no six-minute observation form was counted in which only one behavior occurred. For example, if the child sat reading for six full minutes each row would simply have one code--attention to individual work with no response by agent. Since many one-category intervals occur in the

special class, and they are easy to record, it was felt their inclusion would inflate the reliability coefficient. The observer in the regular classroom was required to reach a criterion of five consecutive two-minute observations of .80 or better with the training observer. For observers in the treatment classroom the criterion was .90 or above. The reason for the higher criterion in treatment was due to the low variability in subject behavior. The token classroom was structured so that few behaviors were emitted other than study behaviors. In general, the training process required one week (one hour sessions per day). Generally the new observers spent two days practicing and three checking reliability with the trainer. The average for the group of observers was 21 practice observations prior to meeting criterion. It was found that weekly spot checks on reliability were necessary to maintain inter-observer agreement.

To determine the passage of time, the observers used interval timers mounted on clipboards. At the end of each 15-second period a "bleep" was heard in the earphone and a light mounted in the clipboard flashed. This was the signal for the observer to record the behaviors and move to the next interval on the observation form.

Observations of the subjects were taken in the regular classroom prior to enrollment in ELP, during treatment, and for a two-month follow-up period. Patterson, Shaw and Ebner (1969) report that obtaining between 40 and 150 minutes of observation yields reliable data with the current form. Baseline data for each subject consisted of a minimum of 60 minutes in the regular classroom over a two-week period.

During treatment three observers, recording one hour each, obtained daily observations for all academic periods. Each observer, recording behaviors for one child at a time, was instructed to begin recording with any child on a random basis. Once a six-minute observation was complete they were to move to the next child in seating order. This sequence was to continue for their entire hour. The total number of observations for the eight week period averaged 64, or 6.4 hours per subject.

Follow-up observations in the regular classroom were obtained bi-weekly at random times during academic portions of the day. A minimum of 32 observations (192 minutes) were obtained for each child during post treatment data collection in the regular classroom.

A graduate student in school psychology was hired to serve as observer in the regular classroom setting. He recorded pretreatment and post-treatment observations. The observer was not informed as to which condition was operating for any child. His instructions were to make visitation arrangements with the teacher prior to entering the classroom. Upon entering the room he was introduced to the children as a college student studying to be a teacher. As such, "He would be taking notes on the kinds of things they are doing." The teacher was informed that the observer was recording only the behavior of the deviant child and that her methods of teaching were in no way being evaluated. The observer was not to interact with the children or put the name of the child being observed on the observation form. These measures were all designed to reduce the effect of observer presence.

The observers in the treatment setting observed the children from behind a one-way mirror and at no time were seen by or interacted with the children or teachers. Both children and teachers knew that frequently they were observed but did not know when or what behaviors were recorded.

Patterson and Harris (1968) report that the observer's presence, at least in the home, does alter behavior. They found the effect of observer presence is to increase variability in the data. Observer presence undoubtedly altered behavior somewhat in the present study. However, it is felt this effect would remain constant across settings.

Results

The proportion of teacher attention to appropriate and inappropriate behavior was computed by dividing the total attention to inappropriate behavior and total attention to appropriate behavior by the total attending for each teacher. The proportion of attention to appropriate behavior based on the mean for all teachers in pretreatment was 58.33; attention to inappropriate was 41.67. The range across teachers was from 100 percent attention to appropriate to 100 percent attention to inappropriate behaviors. Forty percent of the teachers responded to inappropriate behaviors of the subject child more frequently than appropriate behaviors.

During the treatment condition the two trained teachers responded to appropriate child behaviors with 97.86 percent of their total responses; with only 2.14 percent of responses to inappropriate behaviors of the children.

An analysis of variance for the mean baseline and follow-up teacher attention scores was computed to determine if the teachers changed their behavior toward the treated child. The results as shown in Table 1 indicate that the differences between pretreatment ($\bar{x}$=58.33) and post-treatment ($\bar{x}$=75.74) attention to appropriate behavior was significant at the .001 level.

Insert Table 1 About Here

Since the project staff interacted with the teachers in three of the post-treatment groups, it could be argued that the difference was a result of this interaction. To test this hypothesis, scores from the control group only were computed and found to be significantly different (pretreatment $\bar{x}$=57.72; post-treatment $\bar{x}$=72.45).

A Pearson product-moment correlation was computed to measure the relation between teacher responses and observations of child behaviors. The total attention to appropriate behaviors for each teacher was correlated with the rate of appropriate behavior of the child.

During pre-treatment the correlation between teacher behavior and child behavior was +.36. During post-treatment the correlation was +.72.

To analyze differences among the various post-treatment strategies in amount of teacher attention to appropriate and inappropriate responses an analysis of variance was computed. Table 2 indicates the differences between groups were not statistically significant. The

change scores shown in Table 3 indicate that the teachers of children in the peer reprogramming strategy altered their behavior the most (21.99 points); teacher training group next (19.00); followed by the control teachers (14.99) and finally equating external stimuli strategy (13.82).

Insert Tables 2 and 3 About Here

The proportion of teacher attention to behaviors of the subject child in relation to total teacher time available was computed on the basis of average class size. Theoretically, with 24 children in the average classroom any one child should receive 1/24 or 4.17 percent of the total teacher time available. On the average the deviant subject child received 9.20 percent of the teacher's time during pretreatment observation. Of the total time the teacher interacted with the child, an average of 3.83 percent was given to inappropriate behaviors and 5.37 percent to appropriate behaviors.

Following treatment the teachers spent less time attending to the deviant child -- 6.95 percent of total time. The total percent of teacher time spent attending to appropriate behaviors dropped slightly from 5.37 percent in pretreatment to 5.27 in post-treatment. The more significant change occurred in teacher attention to inappropriate behaviors. The total percent of teacher time spent attending to the inappropriate behaviors of the subject fell from an average of 3.83 percent to 1.68 percent in post-treatment.

Insert Table 4 About Here

As shown in Table 4, direct positive interactions in the form of praise or positive physical contact occurred .01 times per minute in pretreatment as compared to .05 per minute for disapproval and negative physical contact. Thus the teacher on the average spent five times as much time in direct reproof than in direct approval.

In post-treatment the average teacher praise and positive physical contact increased from .01 to .015 per minute and rate of disapproval and negative contact fell from .05 to .035 per minute.

The data from the experimental classroom indicated the teachers gave praise and positive attention .02 times per minute and disapproval and negative physical contact .007 times per minute.

From the experimental class data it can be seen that while the teachers responded to appropriate behavior .83 times per minute, behaviors which could be described as praise or positive physical contact occurred only .02 times per minute. For one group of six subjects the teachers were asked to record a tally each time they praised any child. The six subjects in the group immediately preceding recording were used as controls. The rate of praise and positive contact for the control group was .01 per minute per child. For the recorded group it was .05 times per minute. Thus during the time the teacher's recorded frequency of their own behavior they gave five times as much positive praise and contact per child. The data from the teacher records indicated the average number of positive interactions was 19.4 per day per child. The mean range across children was from 25.3 to 14.6 per day.

Discussion of Results

Among the 44 classroom teachers, the average teacher spent over 40 percent of his, or her, time responding to inappropriate behaviors of the child. Regardless of theoretical focus, these data have important implications. This percent would appear undesirably high from the standpoint of the intermittent reinforcement hypothesis or the attention-as-reinforcer hypothesis.

Of the total responses, 97.86 percent were to appropriate behaviors for the trained special class teachers. This level would appear to be more desirable for both teacher and child. O'Leary and Drabman (1970) report based on data from Lorr (1969) that "probably low rates of disapproval, soft reprimands, and high rates of praise would effect the most marked changes in behavior."

The support for working with the child rather than the environment rests on the assumption that if the child's behavior changes, the environment will in turn change to become more reinforcing of the new responses exhibited by the child. Patterson, Cobb, and Ray (1970) report that "The informal follow-up of these cases [family interventions] suggested that the hoped-for changes in contingencies did not, in fact, occur. This experience convinced us that we should train parents, siblings, teachers, and peers rather than directly train the deviant child [p. 2]."

The results presented here suggest that the teachers do change their behavior significantly. This change may be due, at least in part, to the fact that the children were performing better than prior

to treatment and thus there were fewer behaviors to reprimand. Despite the change in teacher behavior, the levels of attending to appropriate behavior were low enough to warrant intervention with the teacher. In other words, the teacher does change her behavior after the child returns from outside treatment but not enough to maintain the appropriate behavior at the desired levels (Walker & Buckley, 1970).

There was a considerable change in correlation between teacher behavior and child behavior in pretreatment and post-treatment. These data could be explained in terms of the child becoming more responsive to teacher dispensed attention or reinforcers.

For the four separate post-treatment strategies there were no significant differences in teacher attention to appropriate behaviors. Thus the teachers given brief training were not significantly better at attending to appropriate behaviors and ignoring inappropriate than the other three groups of teachers. These results would indicate that in order to alter teacher behavior, either more extensive or more effective methods need to be utilized in conjunction with those presently available.

The large proportion of available classroom time the deviant children received from the regular classroom teachers supports the hypothesis by Patterson, et. al. (1970) that the deviant child does in fact get high levels of positive and negative attention. Some teachers have been unwilling to use behavior modification techniques because of the apparent time it would take to implement. Yet this time could hardly be significantly more than that now spent responding to inappropriate behaviors.

As shown in Table 4, the treatment level for attention was quite high in the special classroom, yet actions considered praise or positive physical contact were only .02. The behavior of the children was under good control which suggests possibly that attention itself is reinforcing. This could be true in the regular classroom as well although the present data is not broad enough to measure that variable.

These data show that teachers trained in behavior modification can effectively increase their rate of social reinforcment by recording their own behaviors. Although no external reinforcers were made available to the special class teachers for increasing their rates they reported both positive (intrinsic) and aversive (social) controls over their behavior.

Implications for Classroom Practice

The average teacher during pretreatment spent 3.83 percent of her total time responding to inappropriate behaviors of one child. In addition 40 percent of the average teacher interactions with the deviant child were to inappropriate behavior. Most teachers would agree that this time could be better spent on productive classroom activities.

Data from the literature (e.g., O'Leary & Drabman, 1970) and from the experimental classroom setting reported here indicate that children perform well under conditions of high attention to appropriate behavior and low rates of attention to inappropriate behavior. Even though the evidence indicates that the deviant child demands high rates of attention to both appropriate and inappropriate

behavior (Patterson, Cobb, & Ray, 1970), the teacher can alter the schedule. By simply recording their own behaviors the experimental classroom teachers were able to increase their rate of praise five-fold.

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Footnotes

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Table 1

Summary of the Repeated Measures
Analysis of Variance of Teacher
Attention to Appropriate Behavior
in Baseline and Follow-up

Source	SS	df	MS	F	p
Total	58,742	87			
Subjects	32,127	43			
Treatments	6,666	1	6,666	14.39	$< .001$
Error	19,949	43	463.93		

Table 2

Summary of the Analysis of Variance of
Teacher Attention to Appropriate Behavior
in Follow-up by Maintenance Group

Source	SS	df	Ms	F	p
Total	17365	43			
Between Groups	1851	3	617	1.59	$> .05$
Within Groups	15,514	40	387.85		

Table 3

Analysis by Groups (Gain Scores) of
Teacher Attention to Appropriate Behavior
Baseline Treatment Follow-up

	$\bar{x}$	$\bar{x}$	$\bar{x}$	Net Gain
Exp. Gr. 1 (Peer)	60.72	97.72	82.27	(21.99)
Exp. Gr. 2 (Ex. St.)	67.72	98.00	81.54	(13.82)
Exp. Gr. 3 (Teacher Tng.)	47.18	98.09	66.72	(19.00)
Exp. Gr. 4 (Control)	57.72	97.63	72.45	(14.99)
	$\bar{x}$	$\bar{x}$	$\bar{x}$	
	58.33	97.86	75.74	(17.45)

Table 4

Rate per minute of teacher attention and responses to appropriate and inappropriate child behaviors.

	Rate of Praise and Positive Physical Contact	Total rate to appropriate S behavior	Rate of disapproval and negative contact	Total rate To Inappropriate S Behaviors
Pretreatment	.01/min.	.21/min.*	.05/min	.14/min.*
Treatment	.02	.83 *	.007	.02 *
Post-treatment	.015	.21 *	.035	.06 *
*Maximum rate = 4.00				